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THE
ONTARIO WATER RESOURCES
COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF THEDFORD

COUNTY OF LAMBTON

VILLAGE OF THEDFORD - 1968
COUNTY OF LAMBTON

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Report on a water pollution
survey of the village of
Thedford, county of Lambton.
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REPORT

ON A

WATER POLLUTION SURVEY

OF THE

VILLAGE OF THEDFORD

COUNTY OF LAMBTON

AUGUST 1967

JULY 1968

DISTRICT ENGINEERS BRANCH

DIVISION OF SANITARY ENGINEERING

ONTARIO WATER RESOURCES COMMISSION

REPORT

INTRODUCTION:

A water pollution survey of the Village of Thedford was conducted by Commission staff during August 1967 and July 1968. Mr. W. Earnshaw, Clerk-Treasurer, Village of Thedford, provided information pertinent to the survey. Mr. A. McLeod, Road Superintendent, assisted with the investigation and sampling programme.

GENERAL:

The Village of Thedford with an assessed population of 671 (1968 Municipal Directory) is located on Highway #82, in the north-eastern portion of the County of Lambton. The municipality is approximately 420 acres in size.

In general, drainage waters from the village area flow via municipal drains, storm sewers, and private drains, into tributaries which lie within the Ausable River watershed.

The water pollution survey, as conducted, consisted of locating and sampling municipal surface water drains and storm sewers, which contained significant flows, to determine the level of pollution being discharged into the watercourses from the village area.

The appendices to this report include the laboratory analyses results, a map showing the location of the sampling points as well as an interpretation of the analyses. At

present, the Village of Thedford does not have an official plan. To encourage an interest in planning, a section has been included on the need for local planning.

WATER SUPPLY:

The potable water supply for the Village of Thedford is obtained from one drilled well and receives chlorination treatment prior to distribution to its consumers. In 1968, an average daily consumption of 0.039 mgd was recorded at the water works. The village is presently working towards the provision of an additional source of water.

WASTE DISPOSAL:

Municipal

Septic tank systems are utilized on most properties for the treatment of residential and commercial sanitary sewage and domestic wastes. The predominately clay soil conditions tend to result in unsatisfactory operation of field tile disposal beds in many instances.

Refuse Disposal

The Village of Thedford and the Township of Bosanquet use a common landfill operation located in Lot 17, Concession 1, of the Township of Bosanquet.

It was apparent that the refuse, although deposited on flat land, has been pushed into an adjacent gully. During

spring runoff and precipitation periods, there is a good possibility that water filters through the refuse on its route to the Ausable River. This appears to be a possible source of pollution to the Ausable River and should be investigated further by the Department of Health Officials.

WATER POLLUTION:

Surface Water Drainage

A total of 16 surface water drains or watercourses were examined for water quality.

A perusal of these results indicated that 13 sampling points had high concentrations of biochemical oxygen demand or suspended solids. Fifteen of the 16 sampling points had coliform organism counts above OWRC objectives of 2,400 coliforms per 100 ml of sample.

Anionic detergent concentrations (as ABS) were found in 14 of the 16 points sampled. These concentrations ranged from 0.2 ppm to as high as 30 ppm.

The above-noted constituents are indicative of sanitary sewage and domestic wastes.

SUMMARY:

Based on the observations and findings of this survey, it is evident that domestic wastes and sanitary sewage are gaining access to municipal surface water drains.

These wastes are being discharged from residential and commercial properties on which satisfactory private sewage treatment is not being provided. The practice of discharging inadequately treated effluents from septic tanks, and polluting materials from any sources, into a surface-water drain or watercourse constitutes a violation of Section 27, Subsection (1) of the Ontario Water Resources Commission Act which states:

"Every municipality or person that discharges or deposits or causes or permits the discharge or deposit of any material of any kind into or in any well, lake, river, pond, spring, stream, reservoir or other water or watercourse or on any shore or bank thereof or into or in any place that may impair the quality of the water of any well, lake, river, pond, spring, stream, reservoir or other water or watercourse is guilty of an offence and on summary conviction is liable to a fine of not more than \$1,000 or to imprisonment for a term of not more than one year, or to both".

RECOMMENDATIONS:

1. A sewerage works programme consisting of the installation of an adequate system for sewage treatment should be instituted for the Village of Thedford.

In the event that this solution does not prove to be feasible, the municipality should then take positive measures to ensure that all private drains, which discharge inadequately treated sewage into any storm or surface water drain, be located and severed.

2. The operation of the present refuse disposal site should be investigated further and the possibility of a new location, more remote from the watercourse be considered.

Prepared by

W. L. Talbot

W. L. Talbot, Civil Technologist,
Division of Sanitary Engineering.

WLT/bb

APPENDIX

SIGNIFICANCE OF LABORATORY ANALYSES

BACTERIOLOGICAL EXAMINATION

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objective for surface water quality in Ontario is maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms.

SANITARY CHEMICAL ANALYSES

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million (ppm) is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally the most significant of the solids analyses with regard to surface water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the habitat of fish. Where suspended solids values are less than 20 ppm, laboratory difficulties are experienced and the turbidity is determined instead.

Turbidity

Turbidity is caused by the presence of suspended matter, such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water. It is an expression of the optical property of a sample and the results are reported in "Turbidity units".

PHYSICAL DETERMINATIONS

Dissolved Oxygen

The amount of dissolved oxygen contained in unpolluted water fluctuates with the temperature. A deficiency of oxygen in water is replaced by oxygen from the atmosphere. There is a saturation value for each temperature. At 18°C this is 9.54 ppm of dissolved oxygen. Values below the saturation level indicate the presence of polluting organic substances which are absorbing oxygen from the water. The extent of this deficiency is one index of the degree of organic pollution. Substantial reduction in dissolved oxygen causes suffocation of fish.

Temperature

The temperature of water influences the solubility of oxygen and the rate of oxidation and purification.

Anionin Detergent (ABS)

The presence of anionic detergent generally indicates pollution from domestic sources.

Abbreviations and Symbols

Engineering Terms

ABS	-	Alkyl benzene sulfonate
BOD	-	Biochemical oxygen demand
gpd	-	Gallons per day
mgd	-	Million gallons per day
ppm	-	parts per million
ppb	-	parts per billion
ml	-	millilitre
MF	-	Membrane filter

Miscellaneous

Diss.	-	Dissolved
No.	-	Number
Susp.	-	Suspended

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMMES

Currently, there are three general methods which may be utilized for implementing sewage and water works programmes. These are: (1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, (2) by requesting the provision of service from a Provincially-owned project, and (3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Section 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of the Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J.R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new programme allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this programme could be implemented in that the municipality may request that this Commission provide only major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the effected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installation will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

APPENDIX
COMMUNITY PLANNING

The need for effective planning has become more important to-day than ever before. Municipalities are being burdened with the rising costs of land and labour. Therefore, any project a community hopes to develop should be based on sound planning. Planning at all levels of government is essential but, community planning can be most effective if interest and initiative is generated at the local level. The enormous benefits accrued as a result of good planning can more than compensate for the initial investment.

Community planning can be described as an effort to control and direct development effectively. This can best be achieved through the development of an official plan. An official plan is the stated intention of the local authorities with respect to orderly development within the planning area, that is prepared and set forth with professional assistance and meets the requirements as set out by the Provincial Planning Act. An official plan can be a joint effort by a number of municipalities which have common basic characteristics and common problems, or one municipality can establish a plan on its own initiative.

Orderly development yields future economy in services. Development in the community can be retarded where an official plan does not exist. A plan provides, among other things, the

the framework for the rational design of water and sewage works and also the extensions of mains and collector sewer systems.

A local council having decided to proceed with a programme of community planning definitely should contact the Ontario Department of Municipal Affairs. Through its many branches, information and guidance is provided to all interested parties.

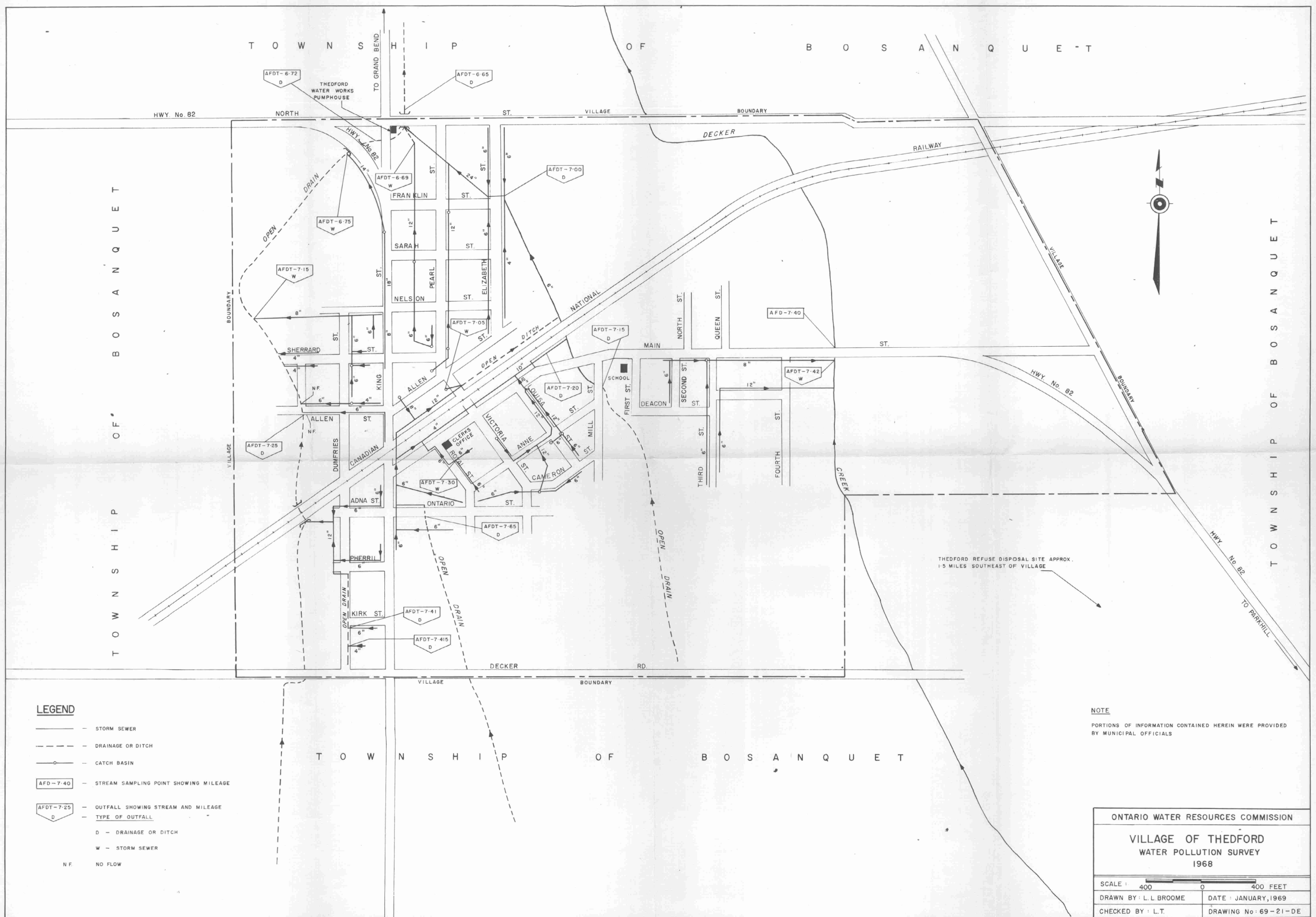
TABLE I

VILLAGE OF THEDFORD - WATER POLLUTION SURVEYSURFACE WATER DRAINS AND STORM SEWERS

<u>Location of Sampling Points</u>	<u>Description of Sampling Points</u>	<u>5-Day BOD (ppm)</u>	<u>Solids (ppm)</u>			<u>Anionic Detergent as ABS (ppm)</u>	<u>Coliforms per 100 ml (M.F.)</u>	<u>Date Sampled</u>
			<u>Total</u>	<u>Susp.</u>	<u>Diss.</u>			
AFDT-7.65 D	Open Drain near Ontario Street.	90	606	109	497	0.2	35,000,000	August, 1967
		86	944	222	722	5.0	720,000	July, 1968
AFDT-7.25 D	Open Drain at Allen Street.	172	1110	400	710	5.6	220,000,000	August, 1967
		32	820	122	698	0.5	910,000	July, 1968
AFDT-6.65 D	Municipal Drain at North Street.	160	1004	296	708	9.3	23,000,000	August, 1967
		22	794	40	754	0.3	25,000	July, 1968
AFDT-7.05 W	Storm Sewer at Pearl and Allen Streets.	460	1752	692	1060	1.0	1,500,000	August, 1967
		348	1348	144	1204	0.7	100,000	July, 1968
AFDT-7.20 D	Storm Sewer Drain at CNR Tracks.	152	674	76	598	6.4	16,000,000	August, 1967
		14	856	31	819	0.3	280,000	July, 1968
AFDT-7.15 D	Open Drain at Mill and Main Streets.	26	724	49	675	0.7	200,000	August, 1967
		5.2	320	39	281	0.20	240	July, 1968
AFDT-7.42 W	Open Drain at Decker Creek.	7.2	336	10	326	1.1	1,300,000	August, 1967
		4.4	496	40	456	0.0	12,000	July, 1968

Continued.....

Location of Sampling Points	Description of Sampling Points	5-Day BOD (ppm)	Solids (ppm)			Anionic Detergent as ABS (ppm)	Coliforms per 100 ml (M.F.)	Date Sampled
			Total	Susp.	Diss.			
AFD-7.40	Decker Creek at Highway #82.	5.6	324	15	309	0.2	230,000	August, 1967
		1.7	486	22	464	0.0	19,000	July, 1968
AFDT-7.41 D	Private Drain near Kirk Street.	26	1010	132	878	1.0	102,000	July, 1968
AFDT-7.415 D	Private Drain near Kirk Street.	187	1068	144	924	30.0	9,400,000	July, 1968
AFDT-6.75 W	14" Ø Outfall near North & King Streets.	46	894	41	853	0.5	1,290,000	July, 1968
AFDT-7.00 D	Storm Sewer at Eliza- beth & Franklin Streets.	32	820	122	698	0.5	910,000	July, 1968
AFDT-6.69 W	Storm Sewer between Pearl & King Streets near North Street.	43	908	214	694	0.7	2,100,000	July, 1968
AFDT-6.72 D	Open Drain near Thedford Water Works Pumphouse.	36	832	107	725	0.4	2,500,000	July, 1968
AFDT-7.15 W	8" Ø Outfall to Open Drain at Nelson Street.	61	804	107	697	1.3	7,800,000	July, 1968
AFDT-7.30	Storm Sewer on Royal Street near Main St.	345	1858	726	1132	10.2	22,000,000	July, 1968



LEGEND

- STORM SEWER
- - - DRAINAGE OR DITCH
- CATCH BASIN
- AFD-7-40 — STREAM SAMPLING POINT SHOWING MILEAGE
- AFDT-7-25 — OUTFALL SHOWING STREAM AND MILEAGE
- TYPE OF OUTFALL
- D — DRAINAGE OR DITCH
- W — STORM SEWER
- N.F. NO FLOW

NOTE
PORTIONS OF INFORMATION CONTAINED HEREIN WERE PROVIDED BY MUNICIPAL OFFICIALS

ONTARIO WATER RESOURCES COMMISSION	
VILLAGE OF THEDFORD	
WATER POLLUTION SURVEY	
1968	
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